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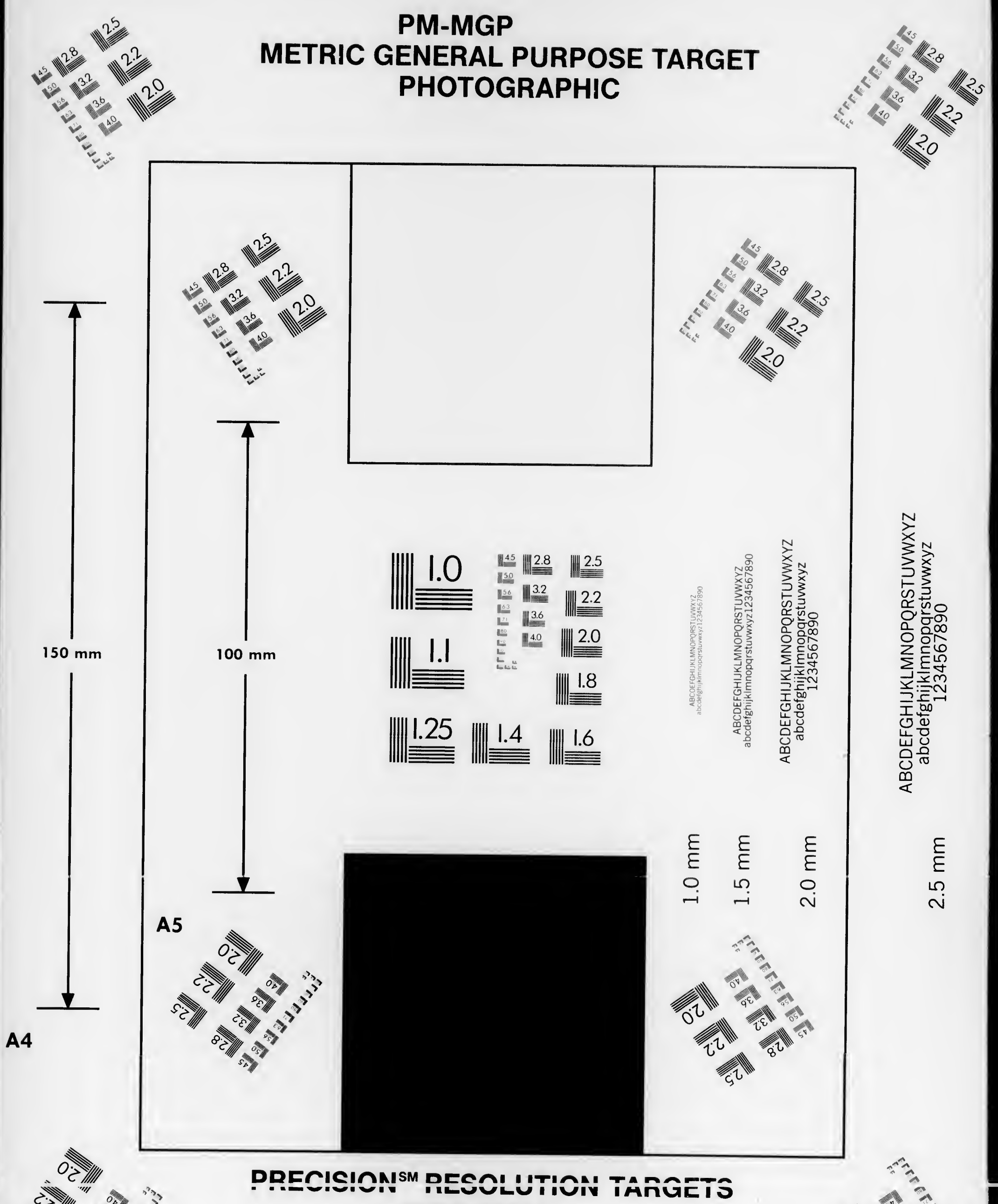

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PHYSICAL ECONOMICS

AN ESSAY ON FUNDAMENTAL PRINCIPLES

BY

L. SOUTHERNS, M.A., B.Sc., Wh.Sch.

1921
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> "Metaphysical nicety, we assuredly do not need; but physical nicety, and logical accuracy, with respect to a physical subject, we as assuredly do."—Preface to *Unto this Last*.

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PHYSICAL ECONOMICS.

I. ECONOMIC ENTITIES.

The study which I propose for our present consideration, and which I have called Physical Economics, is one in which we shall be concerned with some of the fundamental principles on which any satisfactory system of Economics must rest. A system of Economics is a structure of very great complexity, but like many other complex structures it rests on very simple foundations. Our task will be to dig, and to examine. We shall have little to do with the superstructure, and so we shall be able to avoid most of the *complexities* of ordinary Economics, but our excavations will yield us a goodly find of *subtleties*. The most careful attention and thought will be necessary at every stage of our progress. And if our investigations seem sometimes to be leading us in unprofitable directions—into mere academic minutiæ—we must just be patient; and I promise that I will not ask you to examine anything which is not of the very first importance.

First of all, we must be very sure that we understand clearly the meanings of the various terms we employ. And we must adhere strictly to those meanings throughout. I shall have much to say about what we may call ECONOMIC ENTITIES; and we will begin by trying to gain a clear idea of these—a merely formal definition would be quite useless. To this end, let us imagine a fertile but uninhabited island, abounding with animal and vegetable life, and with all the natural requisites for the support of a considerable community of people. One day a party of survivors from a wreck reaches its shores. The party is without food and without implements of any kind. It is clear that operations of a simple nature must soon be begun if the needs of the party are to be supplied; but before considering these, let us take stock of existing assets. We may enumerate land, vegetation and fruits in their natural state, minerals, natural energy—due to sunshine, wind, and tides—animals, growing and fallen timber, and so forth. Also such as are introduced by the shipwrecked party—muscular energy, intelligence, knowledge, &c. But our inventory comprises no accumulated stocks of goods, no tools, no machinery, and no money.

Now, the *mere existence* of the assets we have mentioned could not save the party from starvation. Hanging fruit, even, would have to be gathered. However simple, this gathering constitutes an *Economic Process*. It is a kind of interaction between several of the factors we have already considered, such as the existing fruit, the necessary knowledge on the part of the gatherer, and a measure of muscular energy. These factors, and all the others on our inventory, belong to the first class of ECONOMIC ENTITIES—we will call them PRIMARY ECONOMIC ENTITIES. Notice here the subtle difference between the fruit hanging on the tree, and

the same fruit gathered and ready for use. In the first state it was useless. An Economic Process was necessary before it could be of direct and immediate utility. In the second state it was an article of food, desired and ready for actual consumption.

Again, suppose a rough shelter to be made of fallen branches and sods. As in the last case, we have here an example of the production of a thing actually needed in itself. It has been produced by the interplay of PRIMARY ECONOMIC ENTITIES, but it is not itself a PRIMARY ECONOMIC ENTITY. Like the gathered fruit, it belongs to an entirely different class of ENTITIES. Although this class appears second in our sketch, I will (for a reason which will be clear presently) consider these ENTITIES as belonging to a third class, and will call them TERTIARY ECONOMIC ENTITIES. The TERTIARIES we have so far considered have been produced by means of Economic Processes from PRIMARIES. But it is possible for a PRIMARY to become a TERTIARY without any actual Economic Process taking place at all. For instance, our party might shelter in a cave—which thus immediately becomes transformed from a PRIMARY into a TERTIARY. It is clear, therefore, that I cannot always say immediately that such and such a thing belongs to such and such an Economic class. I must first consider its nature from an Economic point of view. Even the landscape, which aroused no interest at first, may, after the meal of fruit, begin to satisfy an artistic craving on the part of some of the members of our community, and thus fulfil the functions of a TERTIARY ENTITY. Perhaps such a thing hardly comes within the scope of Economics at all, but it is of the same fundamental nature as the other things with which we have to deal, and there is no harm in including it.

But still, very few of the desirable or necessary TERTIARY ENTITIES can be got without the employment of some Economic Process or other. In the cases already mentioned the processes consisted in operating with PRIMARY ENTITIES. For a time, in the community we have imagined, the TERTIARIES will be obtained in this way. Before long, however, an entirely new type of ECONOMIC ENTITIES will make its appearance. Simple *tools* and *implements* will be constructed. These, like the above TERTIARIES, will be produced by the interplay of PRIMARY ENTITIES. But the tools are neither PRIMARY nor TERTIARY ENTITIES. They are not wanted for the actual satisfaction of needs, as were the food and the shelter. They are required, not for themselves, but for the help they will give towards the more abundant and easy production of TERTIARY ENTITIES. They occupy a position intermediate to that of the PRIMARY and the TERTIARY ENTITIES, and for that reason we will call them ECONOMIC ENTITIES of the second class, or SECONDARY ECONOMIC ENTITIES.

Suppose that some member of the party is able to make rough axes of flint; these will be of great service in cutting and preparing timber for log houses, and other constructions, such as small bridges for crossing brooks, and so forth. So that, although the actual end of all the activities is the production of TERTIARY ENTITIES, it will still be worth while to spend considerable time and energy in preparing ENTITIES of the SECONDARY type. More and better TERTIARIES will then be obtained by the interaction of the various PRIMARIES and SECONDARIES available. An ever-growing stream of SECONDARIES of all kinds (e.g. wooden spades—cut by the help of the flint implements) will be produced, and by means of these and the PRIMARIES—labour, natural resources, &c.—an increasing output of the things actually required—TERTIARY ENTITIES—will be obtained. Probably for a long time no new Economic types will be developed.

We may illustrate the progress of events so far by means of a diagram (Fig. 1).

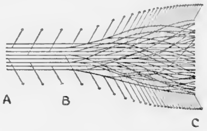

FIG. 1.

At first, only PRIMARY ENTITIES exist. These are indicated diagrammatically by the horizontal lines starting from A. A few TERTIARIES make their appearance, springing as it were from these PRIMARIES. They are denoted by arrows on the diagram. They are the output or the offshoots produced by the interaction of the PRIMARIES. This state of things goes on until, at B, the production of SECONDARY ENTITIES begins. These are shown springing from, and mingling with, the PRIMARIES, and ever increasing in number, by the interlacing lines B C. The TERTIARIES which spring from the combination of PRIMARIES and SECONDARIES are shown by arrows, in greater and greater abundance.

The community is still in a primitive condition, but its activities are directed, as in more complex societies, towards the production of the TERTIARY ENTITIES required or desired by its members. The PRIMARY are employed, and the SECONDARY ENTITIES are produced and employed, to that end alone.

Our ENTITIES, then, are the *real things* which are employed in, or produced by, Economic Processes. They may be such tangible things as land, wheat, bread; or more abstract, as skill, inventive ability, artistic talent. But they are all real, and they are all used in the development of our Economic purposes. It is of interest to look around at the objects in common use and attempt to classify them as ECONOMIC ENTITIES of the first, second, or third kind.

II. ECONOMIC SYMBOLS.

Let us, in imagination, pay a visit to our island after the lapse of many years, during which the population has emerged from the primitive Economic condition in which we left it at the end of the last chapter. Not only will its Economic activities have expanded and become more complex, but we are sure to find that a new Economic type has made its appearance—a type fundamentally different from those which we have already considered. Take a simple instance. A man does a day's work; and at the end of it he receives certain discs of metal, or slips of paper. These he subsequently passes through a pigeon-hole, and in exchange for them he receives a small card. He proceeds, by light railway, to a distant part of the island; duly handing in his card on arrival at his destination.

In this scheme of things we identify two ECONOMIC ENTITIES—the day's work, and the railway journey. The man did his work in order that he might obtain the service of the railway, which he desired. But two other factors appear in the scheme—the money, and the railway ticket. The man did not work for the sake of getting these. Neither of them would *in itself* repay him for his labour. True, he may say that he "works for money," but, on being pressed, he will readily admit that it is not really for the money, but for "what the money will buy." The man who actually desires money *for its own sake* is the miser.

What, then, must we say of the two factors to which we have referred? They do not actually assist in either the day's work on the one hand, or the railway journey on the other. The ticket, for example, did not take part in the actual processes necessary for the journey, as did (say) the coal in the furnace of the engine. *That* was an ECONOMIC ENTITY, as was also the labour of the driver. The skill of the man who designed the engine was also an ECONOMIC ENTITY which formed a necessary contribution to the final result. The money and the ticket belong to another category. The money symbolizes the fact that the man has done so much work for the community, or for some member of it; and is entitled to receive a corresponding service in return. The work and the service are ECONOMIC ENTITIES; the money "represents" them. *It is not an* ECONOMIC ENTITY—*it is an* ECONOMIC SYMBOL. It is a NON-ENTITY. In the above connexion, I have quoted the word "represents," but we shall see later that the statement that money represents ENTITIES is only partially true.

In purchasing the railway ticket, the man merely exchanges one ECONOMIC SYMBOL for another, which specializes the particular service he is to receive, namely, conveyance between particular places. If he had spent his money at a shop, the sequence would have been simpler; comprising two ENTITIES—his day's work and the goods received—and one SYMBOL—the money. The money may be gold, or it may be paper. It is a SYMBOL in either case. Take the less obvious case, that of a gold coin. I have to show that, *considered as a piece of money*, a gold coin is not an ECONOMIC ENTITY.

At first sight it appears to be so, because it is made of gold; and gold, as a raw material for desirable and useful objects, is clearly an ENTITY. But, if we do not clearly resolve this question, we shall never think rightly on Economics. Now, in the first place, a piece of gold of given size and shape, stamped with a given device, is not necessarily money; even though it is indistinguishable from money, so far as any tests which can be applied to it are concerned. I may make a piece absolutely identical in all respects with a sovereign, but it will not be *money*. However valuable it may be, and however many people may accept it as money, it will still be only a *forgery*. This is not because of any suspicion that its value, as gold, is less than that of a genuine sovereign. It is a forgery, and therefore not money, *because an unauthorized person made it*. A true coin is a SYMBOL, but my false one *symbolizes nothing*.

If the true coin is an ECONOMIC ENTITY, so is the false one, for it is identical with it. And vice versa. But supposing both coins are ENTITIES; still one is money and the other is not. Thus the true coin has a property *other than that of being an* ECONOMIC ENTITY. This is its *money property*, which is a *symbolic property*. So, *as a piece of money*, the coin is not an ECONOMIC ENTITY. But is the true coin an ENTITY in any sense? One might answer "Yes, for it can be melted up and made into a wedding-ring, therefore as raw material for the same it is clearly an ENTITY." Now, I say that while the sovereign remains money, it cannot be used to make a ring. The moment we begin to melt, the money vanishes. Even before that, the moment I determine to melt, I abandon the money idea with respect to the piece. While it remains intact, I may look on it *either* as a piece of money *or* as a piece of gold to be melted and used, but I cannot even *look* on it as both. The true coin can be *either* money *or* ECONOMIC ENTITY, but it cannot be both at once. *The two categories are mutually exclusive.* The coin cannot be used as an ENTITY without destroying it as money; while it remains money it cannot be used as an ENTITY—and to call a thing an ENTITY which cannot be used as such is absurd. A gold bar, when made into coins, becomes absolutely lost to the arts, unless, by being melted, it ceases to be money. Now, as gold is very valuable for other purposes, it is clear that we go to an enormous expense of good material when we make our SYMBOLS of gold. There are good reasons for doing this, our Economic system being what it is, but they are not *fundamental* reasons.

But most of our money is not made of gold; it is made of cheaper metals, or of paper. Since we have shown that gold money is not an ECONOMIC ENTITY, we need not stay to show that these other forms are likewise only SYMBOLS and not ENTITIES.

I am aware that the above investigation may strike the reader as "hair-splitting." I grant that the distinction insisted on is a subtle one. But it is an absolutely essential and fundamental one, and unless it is clearly grasped all attempts to think Economically will be futile.

It is, then, evident that money is something radically different from the things we have named ECONOMIC ENTITIES. The SYMBOL, money, must be embodied in some tangible form; but the form has no more to do with the money itself, than the ink with which a signature on a document is written has to do with the real value and significance of the signature itself. If another person forged that signature, even with much more costly ink, its value would hardly be the same!

A signature on a document is a Symbol. If it comes within the range of Economics, it is an ECONOMIC SYMBOL. A document such as a receipt for money or for services rendered is an ECONOMIC SYMBOL. Such a document may be of great importance, but it is not an ENTITY. To be a true SYMBOL, it must symbolize what it professes to symbolize. The person who makes out the receipt could easily make a hundred exactly like it, but these would be false SYMBOLS, and the whole symbolic system would break down. The value of a SYMBOL depends on the fact that it really does stand for something. Suppose I buy a reserved and numbered seat-ticket for a concert. It is a bit of card with certain letters and numbers printed on it. The printer could easily print a hundred exactly alike. But if I find that, on presenting my ticket, 99 other people, with exactly similar ones, are already clamouring for the seat, I feel that my SYMBOL was only a false one, and hardly worth what I paid for it. This particular SYMBOL stands for a definitely specified thing—a particular seat at a particular concert, not any seat at any concert. Money is somewhat different, and is of much more general application. But it is not less a SYMBOL than the concert ticket. A postage stamp is another ECONOMIC SYMBOL. Other examples will occur to the reader.

III. FURTHER CONSIDERATIONS.

A caution! It is very easy when dealing with Economic questions to use language in a very ambiguous and indefinite way. The owner of a certain house affirms "I built this house." But the architect, the contractor, and the bricklayer all say the same. They intend the words to be accepted in different senses. We cannot get on in Physical Economics unless we use our language in a definite and literal manner. Suppose I say "This postage stamp will carry my letter to Australia." Now, the letter will be carried by men, ships, trains—the stamp, so far from "carrying" or even assisting to "carry," will actually make the carrying harder, inasmuch as it adds to the weight to be carried; and delay will be caused by the franking of the stamp. So if we are to get at the heart of the matter, we must avoid ambiguous and figurative language. (Yes, "to get at the heart of the matter" *is* figurative, but it is not meant to be a description of an Economic process!) Again, as we have seen, a railway-ticket does not actually help one on a journey. It might be made to help a little, by being thrown into the furnace of the engine so as to provide a little heat for the boiler, but hardly in any other way. Actually, the ticket is only a SYMBOL, which indicates to the men in charge that one is a right and proper person to travel to a particular destination; i.e., that one has paid the fare. Had one stolen the ticket, instead of obtaining it in the orthodox way, it would have been a false SYMBOL, though it might have passed as a good one. The ticket is quite important, but it is not an ECONOMIC ENTITY. Now, the water in the boiler, turned to steam by the fire, actually takes part in the process we are considering. That is an ECONOMIC ENTITY. Without it, the journey could not be made. But many people have travelled without tickets. It is really because such people exist that tickets are necessary at all. If everyone could be relied on absolutely to announce to the clerk his destination, to pay the correct fare, and then to travel exactly as that payment entitled him, no tickets need be used, and much delay and expense might be spared. Of course, tickets might still be of use in connexion with the keeping of proper accounts by the railway company, but this is quite a subsidiary matter.

Let us enumerate a few ENTITIES—a park, a field, a grain of wheat, a loaf, a plank of wood, a horse, a road, a hammer, an engine, a diamond, a case of wine, an armchair, a concert, musical talent, knowledge, labour-energy, sunshine.

The qualities and functions of these vary enormously, as also do their importance to the community. Without land (of the *field* type, mere *parks excluded*), sunshine, and labour-energy, the community would soon cease to exist. But diamonds could be dispensed with, and no very serious results would follow. Again, a field is used generation after generation; but a case of wine, once consumed, ceases to be available further. A concert is over in an hour or two; an armchair lasts a lifetime. Each, then, has its appropriate use or uses, and maybe abuses too. Some ENTITIES are actually harmful; others may easily become so. Now, the point I want to make is this, that each ECONOMIC ENTITY has its own special quality, or belongs to a special kind or species. We cannot describe an ENTITY by merely answering the question "How much?" We must also answer the question "What kind?" *An* ENTITY, *then, is distinguished as to quantity and also as to kind.* This is so obvious that it may seem almost unnecessary to mention it. Nevertheless, it is of fundamental importance to our inquiry.

IV. HOW DO SYMBOLS REPRESENT ENTITIES?

One often hears the expression "money-equivalent" as applied to an article, or (as we should say) to an ECONOMIC ENTITY. The price that is paid for a loaf, for instance, would be called the money-equivalent of the loaf. A very subtle error, dangerous to all clear thinking, is liable to creep in here. The money, truly, is equivalent to the loaf *in a certain sense.* The two things exchange for one another over the baker's counter. But the mere use of the word *equivalent* in this connexion is almost bound, unless one exercises great care, to carry one's ideas beyond this sense in which the word is used, to other, and wider, *and erroneous* significations. Thinking of money as *equivalent* to bread in this "exchange" sense leads one easily to assume that it is equivalent in other senses too. So much so, that one is apt to say, "Since money is equivalent to bread, and to all kinds of other things, it will be simpler to consider the money alone in my investigations on economics, rather than to keep in mind the multitude of things to which the money is equivalent." Very true, it will be much simpler, and the only drawback will be one that is common to all loose and superficial thinking—the results will be without value.

For money is only "equivalent" to ECONOMIC ENTITIES in a very restricted sense. We have seen

that ENTITIES have two distinct aspects: those of *quantity* and *kind*—they are *quantitative* and *qualitative.* Money, on the other hand, whether of gold or of paper, is really quantitative only. It cannot distinguish between the different kinds of ENTITIES it is supposed to represent. If, then, we think in terms of money instead of in terms of ENTITIES, we have simplified our problems *by ignoring one of the two essential features of the* ENTITIES *about which, in reality, we are concerned in all our Economic activities*, namely, the qualitative feature. In fact, a thing which, like money, is merely quantitative, cannot be equivalent to a thing which is both quantitative and qualitative. If we assumed it to be so, we should easily be led into reasoning of this description: Such and such a sum of money is equivalent to a certain diamond, and the same amount of money is equivalent to 10,000 loaves, therefore the diamond is equivalent to 10,000 loaves—which is absurd. True, in some circumstances these might exchange for one another, but there the equivalence ends. Economic activities have to do with supplying our wants; they are real, and our thinking must be real too.

Certainly, we cannot have in mind the enormous variety of ECONOMIC ENTITIES actually occurring in Economic life. But we must keep in mind at least a few of the most important kinds of ENTITIES, and never let our thinking degenerate to the mere money-plane.

In general, then, SYMBOLS cannot be equivalent to ENTITIES, except in the very restricted sense to which we have referred in connexion with money. A few cases occur, of small importance compared with that of money, in which SYMBOLS have a kind of qualitative aspect. For instance, in the case of a ticket for a specified railway journey, or a ticket for a specified concert. But the most superficial thinker would hardly affirm that the ticket was "equivalent" to the journey or the concert!

It is an interesting and useful exercise to look around and consider the ways in which money *is not* equivalent to the various ENTITIES which we see—an engine *which propels a car*; a house *which shelters from wind and rain*; a lamp *which sheds light*; a scientist *who thinks* (for a man, too, regarded as an active agent, may be looked on as an ECONOMIC ENTITY); a poet *who sees*; an artist *who creates*; an acorn *which "grows."*

Ah! but we are told that *money* grows. Let us consider, in a new chapter, the whole question of growth.

V. GROWTH.

No acorn ever grew into an oak. No child (regarded as a physical being) ever grew into a man. An acorn, *together with a great quantity of external matter*—carbon, water, &c.—*combined to produce* an oak. ENTITIES like sunshine were also needed, though they, unlike the material constituents, are not immediately obvious in the tree. But if the tree be cut down and burned in a furnace, the energy which resided in the sunshine will be given up, and may be made to drive an engine. Now, not more than an infinitesimal proportion of the matter and energy of the oak was in the acorn; perhaps none—I am not botanist enough to know. But I do know that when an oak grows, neither matter nor energy is created. It existed elsewhere before; and if the oak weighs a ton and the acorn an ounce, then at least 19 cwt. 111 lb. 15 oz. of matter has come from external sources. It is much the same with the energy. No, an acorn never yet grew into an oak!

The acorn, apart from external sources of supply, can never produce an oak. It contains a little material and energy, and may, for all I know, produce the small beginnings of an oak. It seems to have the power of attracting the external supplies, if these are readily available. Later, leaves and roots perform this function. The result is the full-grown oak. But why an oak? The sunshine, rain, earth, had no special and distinctive *oak*-forming properties. Why not an elm? Because the acorn contained within itself, in some mysterious way, the *law of growth* which determined the result.

We can now set down three things:—I. All the matter and energy in the oak, which were not originally in the acorn, have been supplied from external sources. That is, the *whole* of the increase is derived from outside. Suppose the acorn could *of itself* produce a little oak. This could not have in it the minutest fraction of an ounce more matter than that already in the acorn! II. The acorn supplies the *law of growth*—the plan of operations, so to speak, by which the final result is to be attained. III. No acorn, no oak.

Again, I visit a factory (out of working hours) and am shown a room, empty, save for a large and complicated machine which has just been installed. It is capable, I am told, of turning out completed watches, at the rate of 100 a week. A week later I return, and find the machine exactly as it was before, with the exception of an insignificant trace of wear in some of its parts. Beside it, I see 100 watches. The machine has lost nothing; at least, nothing which is to be found in the watches. Nothing at all—except some minute portions rubbed off during the week's work. Then whence this produce? During the week, energy has been supplied to the machine, partly over electric wires, partly by an attendant. Raw material also. Thus: I. Everything in the watches has been supplied by outside sources. The machine has supplied none of this. The *whole* of the increase is derived from outside.

II. The machine has supplied the law of growth; or, it has determined the manner in which the externally supplied energy shall act on the externally supplied raw material, so as to produce articles of a definite kind. III. No machine, no watches, i.e., for this method of turning out watches, the machine is necessary. The energy and raw materials alone would not have produced watches, any more than sunshine and rain would have produced an oak without an acorn.

The three factors of growth or increase are the same in the two cases. Such, in general, are the factors of growth or increase of ENTITIES with which we have to do in Economics.

Now, consider money—gold coins, or paper notes. These clearly have no power of growth. We can take other coins or notes and add them to the first, but this is no more growth than taking other acorns, and adding them to the first, would be oak-building. The fact is, we can only say that money grows if we use a *figure of speech*. Money does not increase. Money does not attract money. Figures of speech, imported into science, are prolific sources of bad thinking and of absurd conclusions.

We have already shown that money is not equivalent to ENTITIES in their qualitative aspect, and we now see that it is not equivalent to them in this matter of increase. But we apply to money an *artificial law of growth*, such as the Compound Interest Law. We say that money "invested" (like an acorn planted) increases according to this law.

I invest £1. In ten years the £1 has increased to £2. By the same law, it has increased to £1,024 in 100 years. But clearly the original £1 has not increased, nor has it actually attracted any others to itself. The law of increase is purely artificial, not real as in the case of the acorn or the watch-making machine. The increase is merely obtained by adding pound to pound till the required total is reached. A pound has no more power of growth than a watch. If I lay down a pound, and in ten years find two, it is as if I laid down a watch, and in ten years found two. The first watch has not multiplied itself by two, nor has the second watch sprouted from the first. It has been made, and put there by someone. *Whose is it?* The question is a natural one, and it applies with equal force to the pound. But it is not a question which can be answered off-hand.

Let us look rather more closely into this question of investment. Take the case of the watch-making machine. I invest a sum of money with which the machine is purchased. (It would come to exactly the same thing, so far as the production of watches is concerned, if instead of laying down the money to purchase the machine, I laid down the machine itself.) Now, in 100 years time (no interest having been drawn—we are considering the compound interest law) the money has grown to 1,024 times its original amount. The output being in watches, the watches representing the growth will be equal in value to that of 1,023 machines similar to the original one. As we have previously seen, this increase is *wholly* derived from sources external to the machine; the machine *determines the nature* of the increase; and without the machine the increase would not have occurred. To whom, then, do all these watches belong—or, if we prefer it, to whom does the money derived from the sale of these watches belong? (Of course, we must bear in mind that these watches do not represent the whole output, and we must also remember that more machines will have been made and set to work from time to time, these being paid for by the proceeds of some of the additional watches made.)

We are thus strongly led to consider the question of ownership. But before we can do this we must carry our investigations farther; and first inquire into a remarkable development—that of an entirely new factor—to which we will devote our next chapter.

VI. ABSTINENCE—A NEW ENTITY?

So far we have been concerned with two types of things Economic—ECONOMIC ENTITIES and ECONOMIC SYMBOLS. We are now to consider a new factor, and to inquire whether or not it falls into either of these categories.

A gardener grows potatoes, and of his crop he consumes or sells nine-tenths. The other tenth he reserves as seed, and this he plants in the following year; and so on. Had he chosen to do so, he might have sold his whole crop, and reaped at once the full reward of his exertions. Instead of this, he is content with a smaller immediate gain, in view of the fact that if he kept no seed (other seed being supposed unavailable) he would have no further crops. In fact, he abstains from the immediate enjoyment which he might derive from the sale or consumption of the residue—which residue he plants in the hope of increase in due time. *Is his* ABSTINENCE *an* ECONOMIC ENTITY? I think the question is an important one, for on its answer, and on the logical consequences of that answer, the future course of Economic civilization will ultimately depend.

Of course, the ABSTINENCE is *necessary*; that is to say, if he had consumed the seed there would have been no crop next year. But more than *his* ABSTINENCE is necessary, in this sense, for it is equally important that all his neighbours should abstain from stealing and

eating his seed! Indeed, if only one man in the world does not abstain from this proceeding there will be no future crop.

Again, when my house was built, the mob abstained from setting it on fire. Is their ABSTINENCE an ECONOMIC ENTITY concerned in the production or provision of the house? Certainly, if they had not abstained, the house would not be in existence now.

Leaving the question for the present unanswered, we will proceed to ask another. Should the abstainer be paid for his ABSTINENCE, and if so, to what extent? Consider the factors involved. In the case of the gardener, which we will call Case I, the abstainer *has the right* to consume his seed if he wishes; that is, he has the right to refuse to abstain. I must admit, however, that in making this statement, I do so not without mental reservation. This need not trouble us at present; the reason for it will appear later. In Case II, that of the abstaining neighbour or would-be thief, there is no such right. Not to abstain would in such a case be to be guilty of an obvious crime. The same applies to Case III, that of the mob which refrains from arson.

Again, in Case I the abstainer actually *sacrifices* the present gain which he has the right (always subject to my mental reservation) to enjoy. In Case II there is also a kind of sacrifice, but then the abstainer has no right to the gain which his dishonesty would bring him, and so the sacrifice is not a genuine one. Still less is there anything in Case III which can be called sacrifice on the part of the mob. We arrive, then, at the distinction between Case I on the one hand, and Cases II and III on the other; in the former we have *sacrifice which might legitimately have been avoided* by the abstainer, while in the others no such condition is fulfilled. We must not, of course, jump to the conclusion that whenever a person voluntarily accepts a sacrifice which he might legitimately have avoided, someone is necessarily called upon to pay him for so doing. If you, my dear reader, thrust your hand into the fire, and sustain injuries which you might, without blame, have avoided, please do not call on me to pay your doctor's bill.

But if you do this to rescue from the flames some object, the recovery of which is important to me, the case is altered. What are the reasons for, and who are the beneficiaries of the ABSTINENCE in Case I? (Cases II and III may now be dropped out of the discussion.) The gardener abstains for two reasons; though in individual cases only one of these may actually be operative. They are, first, to secure future gain—to enable him to pursue his business in future years. Without the ABSTINENCE, his gardening would come to an abrupt end. The second reason is, to supply the wants of the community—not as an aid to his former purpose merely, but as an independent end in itself. Who benefit by the ABSTINENCE? The grower himself, and the community which he supplies. For if the potato culture ceased, all would suffer. And yet the seed saving is only a part of the ordinary prudence necessary

for carrying on the culture. But it is vital for the community. Clearly, the buyers of the pototoes *must pay for the seed used*; but must they pay *in addition for the mere sacrifice or* ABSTINENCE *of the grower?* In endeavouring to answer this question we shall be led into an apparently insoluble paradox.

VII. A PARADOX.

In our search for an answer to the question as to payment for ABSTINENCE, let us take a typical case, this time in terms of money. Consider a transaction in which A borrows £100 from B, and pays to B 5% interest in perpetuity. Consider the actual dealings which take place:—

First. B hands to A one hundred sovereigns.

Second. After one year has elapsed, A hands to B five sovereigns.

Third. After two years have elapsed, A hands to B five sovereigns—and so on indefinitely.

For purposes of analysis, however, we may restate the case thus: A borrows from B £100, and at the end of a year pays this back, together with a fee of £5 as recompense to B for ABSTINENCE; that is, for standing out of the £100 for one year. This small completed transaction forms one step of the whole process. A immediately re-borrows the £100, which he keeps for a second year, and then repays with the addition of £5, thus completing the second step of the process. This he repeats indefinitely. (In actual practice, the passing backwards and forwards of the £100 each year may just as well be dispensed with, and thus our re-statement does not in fact alter the real dealings of A and B.) Now, each step of the process as set out above appears to be quite reasonable and just; and as the whole transaction—which is clearly equivalent to the "5% interest in perpetuity" transaction—can be regarded as being made up of such steps, must not this be reasonable and just also? And is it not therefore perfectly clear that payment, in this way of interest in perpetuity, for ABSTINENCE is absolutely just, and that we have arrived at a satisfactory answer to the question with which we concluded our last chapter?

I must here draw attention to a certain principle, which has very wide application. It is a very obvious one, and I will illustrate it by one or two simple examples. A certain chain is required to support a given load. We examine one link of the chain, and find it to be of the necessary strength. But we are not therefore justified, without further examination, in pronouncing the chain as a whole capable of supporting the load. On the other hand, suppose the link we examine is defective, and incapable of standing the strain which would be imposed on it. We *are* justified, without further examination, in saying that the chain as a whole is inadequate for the proposed purpose. Again, I look at one side of an apple, and find it to be sound; but I cannot on that evidence be sure that the apple is a good one. If, however, the side I look at is rotten, I need not examine further in order to assure myself that the apple is bad. In fact, it is often the case that in order to be convinced *that a thing is good* we must look at it from every point of view; whereas we can often be sure *that it is bad* after examination from one point of view alone. For the chain to be good, *every link must be good*; but for the chain to be bad, *only one link need be bad.*

Is it possible that we are in danger of falling into a fallacy with respect to our interest problem? That is, are we, by stating our case in a particular way, and by looking at it from a particular point of view, liable to conclude too rashly that it is good just because it appears so from that point of view alone? Is it possible to state our problem in a different way, and to look at it from a different point of view? Let us make the attempt.

As before, B hands to A one hundred sovereigns. At the end of a year A hands to B five sovereigns; and at the end of another year, another five; and so on indefinitely. Now, at the end of twenty years B has received back one hundred sovereigns; the exact amount which he originally handed to A. If there were no ABSTINENCE to pay for, B would be satisfied.*

But we will assume that there *is* ABSTINENCE to be paid for. How much ABSTINENCE?

If we divide up the whole £100 into twenty parts of £5 each, it is easy to see that the total ABSTINENCE consists of the sum of the following items:—

£5 relinquished for a term of 20 years,
£5 ,, ,, 19 ,,
£5 ,, ,, 18 ,,

and so on, till we arrive at the last item:

£5 relinquished for a term of 1 year.

Thus, at the end of the twenty years B has abstained by a perfectly definite and calculable *finite* amount. There is no further ABSTINENCE, since he has now received the whole sum which he originally relinquished. But he still receives an indefinite number of sums of £5 These, then, constitute the required payment for the *definite and finite* ABSTINENCE of B, since nothing else remains to be paid for—and the instalments of this payment never come to an end. "In the limit," as the mathematicians say, *he receives an infinitely great payment for a finite* ABSTINENCE. This side of the apple does not look quite so sound as the other!

We thus arrive at the conclusion that two ways of looking at the same transaction, both rigidly and mathematically exact representations of it, give rise to two different and contradictory judgments of the justice of the transaction itself. Later on we shall perhaps gain a little light on this apparent contradiction. (It may occur to the reader that an obvious way out of the difficulty is to say that since the payments of £5 during the twenty years were payments of "interest" and not of "principal," therefore B did not receive back what he had lent. A little reflection will, however, show him that this is merely a matter of the use of words—"interest" and "principal"—and the inherent justice or injustice of a transaction cannot be arrived at in this way. I have spoken above of the actual facts—handing over so many sovereigns, &c.—and so have kept clear of the effects of prejudice due to calling one set of sovereigns by one name, and another set of exactly similar ones by another. We are dealing in this essay with real things, and we care nothing for what other people have previously *called* them.)

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* I am not considering questions of risk, &c., that might be a cause of a higher rate of interest. I am simply concerned with that part of the interest in an actual transaction which is supposed to pay for ABSTINENCE.

Let us consider the matter a little further. We have taken a case of 5°/₀ interest in perpetuity. Suppose, instead, the interest to be at the rate of 10°/₀. The whole number of sovereigns relinquished by B will be regained by him in ten years instead of 20 years. His ABSTINENCE will be about half of what it was in the former case. But he will now receive £10 each year instead of £5. That is—half ABSTINENCE, double payment. If the interest were 20°/₀, the total sum relinquished would be received back in five years, and therefore the ABSTINENCE would be about one-quarter of that of the original case. The subsequent payments will, however, be of £20 each year; or, Quarter ABSTINENCE, fourfold payment. *The payment, in fact, is in the inverse ratio of the* ABSTINENCE *contributed. The less the* ABSTINENCE, *the greater the payment.*

It is possible that the reader may detect what looks like a flaw in the above investigations. I will return to the point I have in mind a little later.

In this chapter we have dealt so far with our problem of interest *in terms of money*. But we have previously noted that an Economic process is one which concerns ECONOMIC ENTITIES. So far our investigation has been in terms of SYMBOLS only. Let us translate our "5°/₀ interest in perpetuity" from the symbolic terms into the actual facts for which the symbolism stands.

A builder constructs a workshop (value £100) for a tailor. The tailor does not immediately recompense the builder, but he begins to use the shop, and at the end of the year supplies the builder with a suit of clothes (value £5). We can, if we like, leave out the money-values altogether, and simply say that the workshop is considered by the parties concerned to be equivalent in value, so far as exchange or barter is concerned, to twenty suits of clothes. Each year the tailor supplies a suit to the builder. This goes on for (say) fifty years; and then builder and tailor die, and the workshop falls to pieces.

The firms are carried on, and the new tailor supplies the new builder every year with a suit of clothes—the tailor having procured a new shop (but not by the aid of our particular builder). Years pass, successive generations of builders and tailors come into possession, successive shops are built and decay—none but the original one being due to our firm of builders—but still each year the builder of the day receives a suit of clothes from the tailor of the day. The old shop and the man who built it are long since forgotten, but . . . this is merely "5°/₀ interest in perpetuity."

An obvious extension of this illustration may occur to the reader. Each fifty years (say) a new shop is required. Suppose that, in contradiction to the last case, these shops are supplied by our firm of builders, and on the same terms as before. Now, during the second period of fifty years, the builder receives two suits a year instead of one, although the tailor has only the same shop facilities as before. During the third fifty years, *three* suits a year must be supplied, and so on. An important point to notice is that while the builder supplies a *regular* "stream" of shops— one each fifty years—the tailor supplies an ever *increasing* stream of suits. If the process continued long enough, he would, by a given date, actually be supplying *every year* suits *equal in value to a new shop, though the shops would still be supplied only once in fifty years.*

It is in cases like these that our PHYSICAL method of investigation is able to yield us a clearer insight into Economic processes, and into the actual significance of transactions, than a mere money-investigation could do.

Our questions and contradictions are still unsolved. Let us carry our researches into the foundations of things a little deeper, in the hope that some light at least may be thrown upon them.

VIII. PRODUCTION.

Economic activities are directed in the end to the production (and distribution) of TERTIARY ENTITIES. As we have already seen, these are produced by the interaction of ENTITIES of the PRIMARY and SECONDARY kinds. We have also seen, in connexion with the illustration of the potato grower, that ABSTINENCE is necessary too. It is necessary in the sense that ENTITIES which are required, like the seed potatoes, for productive purposes, shall not be consumed, and so rendered unavailable. A slightly different case is the following. Suppose a machine to be required for certain productive purposes. I am able to provide such a machine; or, alternatively, to provide for myself some article of immediate utility or interest, (say) a touring car. I choose the former. Now, I do not want the machine for its own sake, and it is a definite sacrifice for me to go without my car.

The machine is used in a factory—not by me personally—and I received a part of the produce, or the money for which that part of the produce is sold. In ten years, I have enough money to buy my car, which I do. I have thus abstained for ten years from the enjoyment which I might have derived from it. We may state the case thus: I have, originally, a claim to such and such a quantity of labour, raw material, &c. (i.e. of ENTITIES), and these could be used, according to my choice, for either of the purposes specified above —for the production of the machine for industrial use, or for the car for the satisfaction of my immediate desire. I abstain from employing those ENTITIES for the latter purpose. So the case is really only a variation of the one in which the grower abstains from eating his seed potatoes which are required for productive purposes.

ABSTINENCE, then, is necessary, but only in so far as this means that ENTITIES which are wanted for productive purposes shall not be consumed or used to provide things of immediate utility. In fact, ABSTINENCE is necessary, in so far as this implies that ENTITIES which are required as SECONDARY ENTITIES, or required in the production of SECONDARY ENTITIES, shall not be used as TERTIARY ENTITIES, or used in the immediate production of TERTIARY ENTITIES. In the above example, I used the ENTITIES over which I had control for the purpose of providing a machine, which was a SECONDARY, instead of a pleasure-car, which would have been a TERTIARY ENTITY.

But ABSTINENCE *itself takes no part in production.* The machine played a part in the making of the final produce, but my ABSTINENCE in itself did not. It did not even produce the machine. That was produced entirely by the ENTITIES over which I had control, such as the raw material and labour on which I had a claim. It did not even decide on the making of the machine as against that of the car—I myself decided that. ABSTINENCE, then, in itself, plays absolutely no part in production. *It is negative*; and things are produced by *positive* factors—matter, energy, skill.

Again, money and other SYMBOLS, in themselves, play no actual part in production. Money does not make money, and it does not make anything else. Because ABSTINENCE and SYMBOLS are alike in this respect, it does not follow that ABSTINENCE is a SYMBOL. It has not the properties of a SYMBOL, for it symbolizes nothing. It is either an ENTITY or a separate type. It needs a little further investigation.

Let us consider in greater detail an example similar to the one we used a little while ago. X, by reason of services which he has previously rendered to the community, or from some other cause, is in a position to obtain for himself ENTITIES of considerable value. Instead, however, of doing this, he provides Y with a workshop, machinery, and raw material; and Y produces finished articles of a particular type. Until these begin to emerge, X supplies Y with the necessary food and accommodation for his maintenance. The produce is then divided in such a way that X receives each year a share equal in value to one-tenth of what he supplied to Y up to the time at which the produce began to be forthcoming. Y now maintains himself, and keeps in order, and renews when necessary, the plant and materials out of his share of the produce. X, then, has supplied the necessary preliminary outfit on which Y lived and worked till produce appeared. Part of the outfit would of course last much longer, and continue to be serviceable for years.

Suppose the total outlay of X corresponded to 100 units of value. At the end of ten years this amount of value has been received again by him, and subsequently he receives 10 units of value per year in perpetuity, all renewals, &c., being provided by Y. Now this amount constitutes X's recompense for ABSTINENCE, in that he abstained from using his 100 units for his own immediate purposes.* But as the limit of this ABSTINENCE in point of time was ten years, it is clear that his ABSTINENCE was definitely finite, while his recompense is, in the long run, infinite.

Translating into money terms, we should say that X invested a sum of money, and received 10°/o interest in perpetuity. Instead of actually supplying the machinery, food, &c., he might hand to Y a sum of money, with which Y would purchase the necessary things, and X would receive from Y his payment in money derived from the sale of the produce.

But it generally happens that X in such cases keeps control of the plant, and takes the produce, out of which he recompenses Y for his labour; and after providing for materials, renewals, &c., keeps the rest for himself. He may lose all, if the project fails of its purpose; but on the other hand, his share may increase greatly. Part of his share he uses for the provision of more plant and material, and also for the preliminary maintenance of more workers. In this way he, so to speak, contributes a new ABSTINENCE, and increased production takes place. After a time, he again puts aside a part of his augmented share, and a further expansion of plant and production takes place, his own personal income

increasing at the same time. In this way, by contributing a succession of finite ABSTINENCES, his revenue may become very great.

Some of the points with which we are dealing may be made easier to understand by the use of simple diagrams, which I will draw to exact scale. First, take the simple case in which X lends out (say) £100, and receives 10°/o interest in perpetuity. (Instead of £100, we may, if we prefer to do so, think of 100 units of value in the form of ENTITIES, and of "interest" of 10 such units each year.) Let time, in years, be measured along the line AB, Fig. 2; and let the state of X's

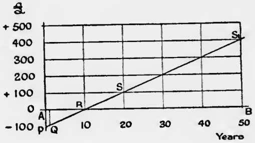

FIG. 2.

exchequer at any time be represented by vertical distances above or below AB. Thus, when X has lent his £100, we suppose his state to be represented by a point 100 units of length below A. This point is marked P on the diagram. The 100 units of length below the line AB correspond to £100 *out of pocket*, and so the point P is situated at −100 as indicated by the scale below A.

At the end of one year X receives £10, and he is then actually only £90 out of pocket. This condition is denoted by the point Q, 90 units below that point on the line AB which corresponds to 1 year from the beginning. At the end of 10 years, X has received, in all, £100; and his state is indicated by the point R, situated *on* the line AB, at a point denoting 10 years from the beginning. In another 10 years, X has received £100 more, and his state is now represented by S, which is +100 units above AB. This shows that he is *in pocket* to the extent of £100. The straight line PQRS can be produced indefinitely, and it will show the state of X's exchequer at the end of any year. Thus at the end of 50 years from the beginning X is in pocket to the extent of £400, as shown by the length of the line BS_1.

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* See footnote, p. 30.

We will next take the more complicated case in which X "contributes successive ABSTINENCES," and we will suppose that at first he lends £100, as before, and that he receives £10 per annum interest. The line PRST, Fig. 3, is exactly as before. But instead of keeping for his own use the full amount of £200 represented by TV, he "re-invests" £100 of this, which he has been saving up during the 20 years represented by RV. Thus, at the time denoted by V, he is in pocket £100 only, and his state is indicated by the point W; and, so far as surplus cash is concerned, his state could be represented at any time during the preceding 20 years by points on the line RW. Now, at time V, he has £200 invested, and therefore he receives £20 a year in future. In 10 years this amounts to £200, as shown by the fact that the point T_1 is 200 units higher than W. But of this X re-invests

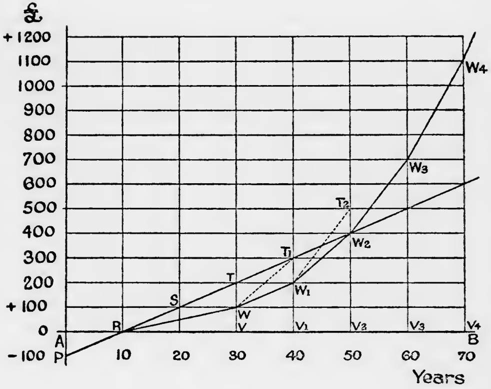

FIG. 3.

£100, which brings his actual state down to W_1, which on being joined to W will give a line showing his state for any year during the period VV_1. Now, at time V_1, X has £300 invested, and he will therefore receive £30 a year. In 10 years this amounts to £300, giving the point T_2. He, however, re-invests £100, bringing his point down to W_2. By similar reasoning we obtain the points W_3, W_4, and so on. The line $RWW_1W_2W_3$ . . . indicates the "in pocket" state of X at times denoted by points on the line AB. The straight line RST . . ., which is similar to the line on the previous figure, shows his state if he does not re-invest. At first that method shows an advantage to him; but, later, it is clear from the diagram that a huge and rapid rise is given by the other scheme. This is a case of 10°/₀ interest in perpetuity, with periodic re-investments. In 100 years from the beginning the amount in hand is £2,900.

There is, of course, no reason in theory why the process should stop at the end of 100 years. It is interesting, as a curiosity, to note that the amount in hand will be in—

200	years	£ 15,400;
500	,,	£112,900;
1000	,,	£475,400.

If the interest had been 5°/₀ instead of 10°/₀, the corresponding figures would have been in—

200	years	£ 2,900;
500	,,	£ 25,400;
1000	,,	£112,900.

Let us now consider the actual assistance rendered by X. He paid £100, as shown at AP. He then began to receive, and his net receipts are indicated by the line $PRWW_1W_2W_3$ . . . . It is true that at time V he has received TV, of which he paid back TW, leaving him with net receipt WV. But in receiving and paying back the amount TW *he has rendered no actual service.* It is merely as though he had received only WV. That is to say, the whole transaction is exactly equivalent to an original investment AP and receipts corresponding to the line $RWW_1W_2W_3$ . . . *with no re-investments at all.* Thus a person Z, paying and receiving on this latter scheme, in reality gives exactly the same assistance as X did, and he receives exactly the same reward.

The passing of £100 back and forth every ten years *actually does nothing* to help the industry. *The positive contribution* of X is thus shown *to be limited to the original payment* of £100 shown at AP.

This is no mere mathematical juggling. Let us consider a case of the same industry as that of the example given above. Suppose Y^1 (a worker like Y of the last case) to be able to provide initially the £100 required to start the industry, instead of being indebted to X for this assistance. He will be able to carry on the industry exactly as before, but will, as the years go on, have, in addition to what Y had in the previous case, the amounts in hand represented by the line $RWW_1W_2W_3$ . . . . That is, without any further difference of any kind whatever, Y^1 will be to this extent wealthier than Y. For example, at the end of the first 40 years Y^1 will have in hand the £200 denoted by W_1V_1, which sum Y has had to pay over to X; similarly, in 70 years the advantage to Y^1 will be W_4V_4, i.e., £1,100.

Now, Y only differed from Y^1 inasmuch as he could not supply the original £100. Given this, he would be identical with Y^1, and would have the same receipts. The only assistance X has rendered to the case is, then, that he has supplied this deficiency. His real contribution is limited to the original provision of the £100. Suppose Y had been able to supply that sum. He could "repay himself" gradually, instead of paying interest to X, in ten years (in addition, of course, to taking the sums he actually did take). That is, in order to be independent of X, and identical with Y^1, he need actually only stand out of £100 for the first year, plus £90 for the second year, plus £80 for the third year, and so on till the end of the ten years.

But since Y is unable to follow this plan, he has recourse to X, who supplies the assistance, or contributes the ABSTINENCES required, viz., £100 for the first year, plus £90 for the second year, and so on, as above; the last ABSTINENCE being that of £10 for the tenth year.

These ABSTINENCES can be represented diagrammatically (Fig. 4).

In the figure, the horizontal line AB represents time, as before, and vertical distances below it denote the "out of pocket" condition of X in pounds. Thus, during the first year, he is out of pocket to the extent of £100; and therefore his state at any time during that year is represented by the short horizontal line at b. During the second year, after he has received the first payment of £10, his state is denoted by the horizontal line at d, 90 units below AB, and so on. The shaded area Ab represents £100 stood out of for one year; cd represents £90 for one year, and so on. The whole

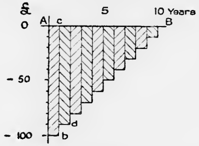

FIG. 4.

shaded area represents the whole of the ABSTINENCE contributed by X to Y. It is nearly the same as the triangle APR of former diagrams.

It is clear that in practice Y or Y^1 would require help as the industry grew; and thus our typical Y or Y^1 will actually represent a growing band of workers. There is, however, no need for X to call others to share in his part of the scheme, for his share is *merely to receive*, after the time denoted by R (Fig. 3) has been reached. Nor is there any need for his re-investments to be made in the same industry every time. Any investment giving the particular rate of interest proposed—10°/o, or 5°/o, or even 1°/o—will answer his purpose (and mine) just as well, except that in the case of the lower rate of interest more time must elapse before the high receipts are reached. The law of progress, however, is the same.

We may refer to the scheme in which Y^1 himself supplies the *nucleus* for the beginning of the industry as the "Y^1 scheme"; and that in which X and Y are associated as the Y + X scheme. Note that the actual industrial operations are exactly the same in the two schemes, and that Y and Y^1 do in all respects identically the same work. Now the *drain on Y* as compared with Y^1 is represented by the curve $RWW_1W_2W_3$ . . . and this because he was unable to supply the nucleus. That is, Y pays as shown in the curve for the ABSTINENCE of X which is shown in the triangle APR. *Y^1 pays for no* ABSTINENCE *at all.* He himself abstained, for he might have spent his £100 immediately, and not have started his business at all. *Once this initial* ABSTINENCE *is over, there is no drain* at all on the industry. Here (as we have seen) Y or Y^1 represents an increasing band of workers.

True, the original Y^1 might only admit others on condition that he received special payments equal to (say) those received in the other scheme by X; and in that case he would become practically equivalent in his functions to X, and might step out of the industry. Then the drain on the industry would re-commence. This is, in fact, a prolific source of X's. But if, by some general arrangement, this can be avoided, and the Y^1 system adopted, it is clear that there is no need for industry to pay for ABSTINENCE. If, however, the Y+X system is adopted, it is no doubt necessary to pay X for his ABSTINENCE. It is all a question of system. Industry can be carried on in various ways. Is the Y+X way a good one?

Suppose I wish my bag to be conveyed from my house to the railway station, I may adopt:

Method I. I employ 1,000 men to stand in line from house to station, and pass my bag from hand to hand; or,

Method II. I employ a man to carry my bag.

If I adopt the first method, of course I must pay the 1,000 men. *If* industry adopts the Y+X method, of course it must pay X. But . . .

IX. ABSTINENCE.

If ABSTINENCE is to be paid for, what is the payment which is proper? ABSTINENCE consists in doing without ENTITIES for a given period; or, in terms of money, of relinquishing so many pounds for so many years. It cannot be computed in pounds or in years alone. Its appropriate unit is not the pound or the year, but the *pound-year*. In Fig. 4 the pound was represented by a *vertical line* of given length, and the year by a *horizontal line* of given length, but ABSTINENCE was represented by an *area*; and a *unit of* ABSTINENCE would be denoted by the rectangular area whose vertical height represented one pound, and whose horizontal width represented one year. What, then, is the number of pounds which is equivalent to a given number of pound-years of ABSTINENCE, and by means of which this ABSTINENCE can be recompensed? There is no answer to the question, because the question is irrational. One might as well ask how many linear yards are equivalent to one acre, or attempt to specify volume in square inches. These mathematical absurdities are no more absurd than the Economic absurdity of attempting to express money as the equivalent of ABSTINENCE.

The only equivalent of ABSTINENCE is ABSTINENCE, and the only *rational* way of paying for it is by means of an equal ABSTINENCE. Suppose my friend lends me £20 for two years. At the end of that time I return the money. I have now to recompense him for 20×2, or

40 pound-years of ABSTINENCE. How can I do this? The only *rational* way is by *lending him* such a sum for such a time that the product of these two factors is equal to 40 pound-years. For instance, I might lend him £40 for one year, or £20 for two years, or £10 for four years, or the like. I do not say that I cannot satisfy my friend (and myself also) by merely handing him a sum of money mutually agreed upon as payment for his 40 pound-years of ABSTINENCE. But I insist that the method I have specified above is the only *rational* method of recompensing for ABSTINENCE, and that the payment by a sum of money is *irrational*. It would be equally so to pay for the ABSTINENCE by means of some quantity of a given kind of ENTITY. It is clear, then, that ABSTINENCE stands in a class apart from the other types which we have investigated. ABSTINENCE *is neither an* ECONOMIC SYMBOL *nor an* ECONOMIC ENTITY.

Let us now revert to the paradox of Chapter VII. In that chapter we reviewed a method (5°/o interest in perpetuity) of paying for ABSTINENCE by sums of money. Looking at the process in two different ways, we found, first, that our notion of justice was satisfied; and, second, that it clearly was not satisfied; and, although we saw reason to condemn the proposed method of payment (because from one point of view it was to all appearances bad), a real solution of the difficulty was not forthcoming. It is now clear that the cause of the contradiction was that the *proposed payment of* ABSTINENCE *with money was irrational*. When the basis of an argument or problem is irrational, we cannot expect to arrive at any rational solution. Contradictions and paradoxes are sure to be met with sooner or later, if, indeed, any kind of solution seems possible at all.

It will be worth while to dwell a little on this matter. Take a simple illustration. Two persons, A and B, stand facing one another at the points shown on Fig. 5. The arrow NS shows the North-South direction. An object at O is under discussion. A states that O is to the left of a point P, midway between them, while B insists that it is to the right. No agreement is possible so long as they fail to realize that right and left are terms which depend entirely on the directions in which the observers happen to be facing at the time. They are *relative* terms. But if A had affirmed that O was *North of P*, B would have agreed; for this does not depend on the position of the observer, the direction in this case being *absolute*. In fact, the disputants were arguing about *relative* terms as though they were *absolute*; and a contradiction, insoluble so long as the basis of argument remained irrational, was the result.

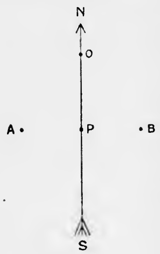

FIG. 5.

A question used to be asked, "If an irresistible body came into collision with an immovable body, what would happen?" The intention was that the question should be answered in accordance with the principles of mechanics; but the qualities ascribed to the bodies contradicted those principles, and therefore the question was irrational. It has, of course, no answer. Neither has the question, "What is the area of a given square circle?" These questions are not devoid of answers because mathematicians are not yet clever enough to answer them, but because they have no meaning. They are irrational.

An experiment on the velocity of light was made by Michelson and Morley, and it appeared to contradict all previous knowledge of the subject. That contradiction led to much investigation, culminating in the work of Einstein, who showed that our ideas of space and time were inadmissible. On these ideas being corrected the old contradiction disappeared.

Probably many other things, which at first seem contradictory, may some day be cleared up in a similar way. *Rationalize the basis of the investigation, and the contradiction will disappear. For instance, if we paid for so many pound-years of* ABSTINENCE *by another* ABSTINENCE *of the same number of pound-years,* no irrationality or contradiction could arise. Unfortunately, this solution does not help us practically, for it is seldom possible for the borrower to lend again to the original lender; and the original lender does not care to be repaid in this way. We therefore, in practice, adopt the irrational method exhibited in our diagrams. On these, the small *area* below AB is "paid for" by the indefinitely increasing vertical *line* above it.* At

---

*Such as the line WV on Fig. 3, which gradually grows to W_1V_1 and then to W_2V_2, and so on indefinitely.

any time, of course, the process may be stopped by *an additional payment* equal to the original sum AP, and in small or private loans such a course is usually taken sooner or later. But how often do the workers by hand and brain pay out the shareholders of a company?

It will, nevertheless, be worth our while to reflect a little on the rational method of paying for ABSTINENCE with ABSTINENCE.

Suppose C lends to D the sum of £100 for ten years; and that D returns to him the same sum at the end of that time. The ABSTINENCE of C can be represented by the area AE on the following diagram, Fig. 6, which is drawn in a manner similar to those we have already studied. How may D repay C *rationally*? By lending him a sum of money for such a time (the money to be repaid on the expiration of that time) that the product:

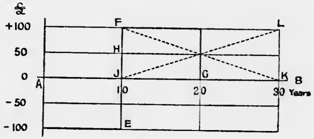

FIG. 6.

(money in pounds) × (number of years)

will be equal to 1,000 pound-years, i.e., to the number of pound-years which measures C's ABSTINENCE. Thus, D may lend C £100 for ten years; in which case the area FG on the diagram will represent the ABSTINENCE he contributes in return for AE. The state of C's exchequer will then be represented for the first ten years by the horizontal line at E, and for the second ten years by that at F.

Any other area, such as HK, or even FKJ or JLK, which is equal to AE, would answer just as well. Suppose, for example, the repayment to consist of 1,000 pound-years made up of £10 lent for 100 years; the corresponding diagram showing the state of C's exchequer is given in Fig. 7 (the arrow "to infinity" being ignored for the moment), the shaded areas above and below AB being equal.

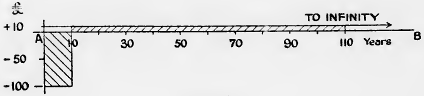

FIG. 7.

But now suppose that D's £10 is never repaid by C; *the upper area would extend, as shown by the dotted arrow, to infinity*. Thus D would be contributing *an infinite* ABSTINENCE in repayment of C's *finite one*. In fact, a sum paid out, and never repaid, is equivalent to an ABSTINENCE of *an infinite number of pound-years*, however small the number of pounds may be.

Let us now take the case we have previously used in which X lends to Y £100 and receives 10°/o interest in perpetuity. X's state at any time is represented by the stepped line PROT in Fig. 8, and when the point O

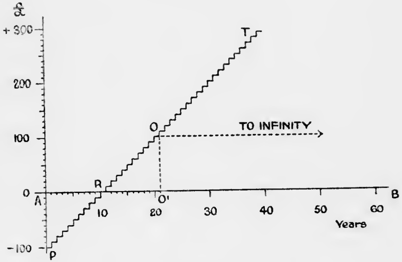

FIG. 8.

is reached it is clear that the number of pound-years contributed to him is equal to that which he himself contributed to Y. From that point the line should fall to O^1, i.e., the £100 denoted by OO^1 should be returned to Y. But instead of this, not only is the sum retained by X, giving an added rectangular area below the arrow "to infinity," but further payments are also received by him giving another area represented by the triangular portion above the arrow.

We previously saw that the payment for a finite ABSTINENCE became infinite in the limit; this is shown by the fact that the line of X's state—the stepped line of the diagram—rises indefinitely above AB. We now see that the corresponding ABSTINENCE, which, on our rational basis of argument, forms the recompense of the original one, becomes infinite too. But it is important to notice that this becomes infinite even if the payments of "interest" cease and the "principal" is returned. For the infinitude of its value does not depend on the amount of interest paid; the payments of interest may be as few and as small as we choose, yet the corresponding ABSTINENCE will increase indefinitely with the mere passage of time. This is clearly shown in Fig. 7. Here only one payment of £10 in addition to the repayment of the £100 principal takes place, but if it is never returned the upper area increases indefinitely.

As a further example, we will take a case in which after five payments of interest the principal is returned. The two ABSTINENCES are shown below and above the line AB in the following diagram (Fig. 9), the interpretation of which I will leave to the reader.

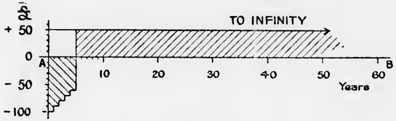

FIG. 9.

By comparison, then, with the rational method of paying for pound-years with pound-years, we are able to see more easily and definitely the *irrationality of any attempt to pay for pound-years with pounds*, for the latter is seen actually to consist in the contribution of *an infinite* ABSTINENCE *for a finite one.*

On page 32, I referred to the possibility of a criticism of the investigations there undertaken. What

I had in mind was this. A critic might put the matter we had been considering in the following way. "Suppose a sum, equal to that borrowed, to have been returned by a given date. ABSTINENCE remains to be paid for. Now, this payment is due immediately. But the borrower does not pay this at once, and therefore the lender in effect *contributes a new* ABSTINENCE, inasmuch as he stands out, for a further period, of what is immediately due to him. Since this argument can be repeated indefinitely, payments must continue to be made in perpetuity."

Let us suppose that the borrower is convinced by this reasoning, and that he pays immediately a sum agreed on in liquidation of the original ABSTINENCE. We can best express the result by means of a diagram (Fig. 10).

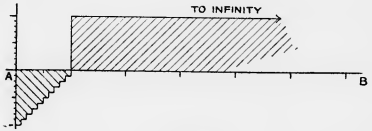

FIG. 10.

Which diagram speaks for itself—infinite ABSTINENCE as recompense for a finite one. Thus the irrationality of the criticism is disclosed.

We can exhibit by means of a somewhat similar diagram (Fig. 11), the interpretation of which may be left to the reader, one of the steps referred to on page 28, which, on a superficial examination, appeared consistent with our notion of justice.

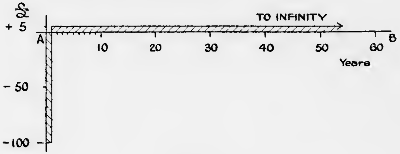

FIG. 11.

The method of payment of ABSTINENCE by ABSTINENCE is here introduced for the sake of logical accuracy, and for purposes of comparison with the ordinary interest method, and also for the light it throws generally on the subject. As I have already pointed out, it does not constitute a practical method which could conveniently replace the other.

X. ENTITIES.

In the last chapter we considered the question of payment for ABSTINENCE. Let us now turn to the corresponding question in respect to ENTITIES. What is the proper reward for ENTITIES supplied? Here, as a rule, no irrationality can trouble us. Clearly the reward will be reckoned also in ENTITIES. The only difficulty is to determine the exact quantity of a particular ENTITY to be considered as the equivalent of a given quantity of another kind of ENTITY. As a general rule, we may, in theory, take a final product, and consider the ENTITIES which have entered into its production. Assuming that no ABSTINENCE is to be paid for, we may proceed to enumerate the ENTITIES, such as skill, labour, actual articles belonging to given individuals, &c., which have to be paid for (excluding such things as sunshine and rain, which do not have to be paid for), and then divide the produce among the people who have supplied these ENTITIES, in a way which *seems fair* in respect of what each has supplied. Here human judgment must come into play; there is no mathematical law of distribution which can be adopted. The distribution here considered is not mathematically determinable, but there is nothing *irrational* about it.

But the persons amongst whom the distribution is to be made do not, as a rule, want the actual things they have produced; but they want other things which they can obtain in exchange for them. The question then arises: On what principle should the exchange of ENTITIES be conducted? Here, again, judgment must be used. In some circumstances a loaf of bread might be more desirable than a much more costly object, such as a watch. There is no *absolute* rate of exchange between these two kinds of ENTITIES, but if the more essential article, bread, is sufficiently abundant, there is nothing irrational in exchanges of bread and watches. Apart from considerations of scarcity, particularly of prime necessities, the baker and the watchmaker should exchange in such a way as to ensure that the ENTITIES supplied by each—the one for making loaves and the other for making watches—are, so far as it is possible to judge, equal.

Another question which must be solved by an appeal to human judgment is: What ENTITIES shall be produced, and in what quantity? The answer should be settled in accordance with the needs of the community. It will not do to consider mere "money-equivalents," and to affirm that the production of ENTITIES should be adjusted so as to give the greatest money-value. It might "pay" better to provide food enough only for the strong part of the population, and to devote the rest of the labour available to the preparation of luxuries of high price. Here the folly of neglecting to consider the actual ENTITIES required, and of looking only at the supposed money-equivalent, is apparent. We have already seen that money is not

equivalent to ENTITIES, and that our Economic reasoning would be useless if we did not realize that fact.

Human judgment, then, is necessary in settling (a) the proportion of produce to be allotted to each person supplying ENTITIES for its production, (b) the proper rates of exchange between ENTITIES, and (c) the proper kinds and quantities of the same to be produced. In practice, (a) and (b) are decided mostly on the "Catch-as-catch-can" principle. As regards (c), the regulation of ENTITIES to be produced rests at present chiefly with lenders of type X of our previous investigations. But their object is not to regulate in accordance with the needs of the community, but to regulate in such a way that the payment, to themselves, for ABSTINENCE shall be as great as possible. We have seen that if industry can *get a start*, there is no need to pay for ABSTINENCE at all. *But the regulation of industry is directed to the maximum payment, and continuous payment, of this very thing.*

XI. CAPITAL.

So far I have avoided the use of the word Capital. One reason for this is that the word conveys different ideas to different people. By Capital, some people mean a sum of money which is invested in an industry. Others mean such things as machinery, stocks of food for workers, &c. According to the first, Capital is what we have called an ECONOMIC SYMBOL; and to the second, an ECONOMIC ENTITY. Clearly, then, if we wish to think about Capital, it is necessary for us to distinguish carefully between its different interpretations. Only confusion can result otherwise.

Is Capital essentially necessary to industry? Yes, and No. Take the potato-growing industry which we have previously used as an example. Now, if by Capital we mean seed potatoes for next year's crop, evidently the answer is Yes. Without this Capital the continuation of the industry is obviously impossible. But if by Capital we mean *money*, then the answer is No. For although, in a particular state of society, a particular individual may find himself unable to start or continue the culture without money, yet we must conclude that money is not a fundamental necessity to the practice of potato growing. A differently constituted society could grow potatoes without recourse to money, but hardly without recourse to seed!

In other words, the necessity, such as it is, for money is purely artificial; while that for seed is inherent in the nature of things. There is, then, a very sharp

and fundamental distinction to be drawn between the two uses of the word Capital.

Now, money can be used in practice to buy seed potatoes, and therefore if the prospective grower has money he can buy these and start his industry. But the money was only wanted to enable him to obtain the seed. The money itself was of no use for his real purpose. It is always the ENTITY and not the SYMBOL which is really needed. And these ENTITIES were produced by other ENTITIES, and not by SYMBOLS, and so on right back to the beginning of Economic activities. ABSTINENCE is necessary, but if an industry can once get a start, no payment need be made, since the industry must naturally reserve a part of its produce for further productive purposes. Industry actually does this already, apart from any payment it makes for ABSTINENCE. Had industry in general, after having been once started in remote antiquity, been carried on subsequently on purely rational lines, no payment for ABSTINENCE would ever have been made at all! For all produce, ENTITY-CAPITAL included, is provided by the hand and brain worker, with the aid of natural resources. The only kind of ABSTINENCE necessary is that which (as we have just seen) is actually carried on by industry already. I do not say that such an ideal state of things was actually possible in the past. Whether industry could be conducted on such lines to-day, is a question beyond the scope of this essay.

What is the chief function of SYMBOL-CAPITAL, or Money-Capital, to-day? It does not create the ENTITIES necessary for production. At a given instant of time, all those necessary for starting a given industry exist. I do not mean that the actual machines (sav) exist, but the raw materials for making these—the intelligence, inventive ability, and so forth—all exist. If not, mere Money-Capital cannot produce them.

Why, then, is this needed? Under present conditions it forms a kind of machinery for bringing together the scattered ENTITIES according to plan. The money does not form the plan; that is done by a brain-worker. I may have muscular energy, you may have knowledge, another land, a fourth a machine-making shop, and so on. But these scattered ENTITIES need to be applied to one another, and some means of accomplishing this must be devised. The natural means in a small primitive society would be mutual agreement. In a large and complex society, this becomes practically impossible. Apart from state or community management, the simplest means is found in the use of money, which is recognized by all as exchangeable for ENTITIES. But I, the labourer, and you, the expert, cannot buy the land and machinery and start the industry ourselves. A Money-Capitalist can, however, buy up what is required, and pay wages to me and salary to you. He ABSTAINS from using his money to buy things for the immediate satisfaction of his desires. Then the curve $RWW_1W_2W_3$ . . . begins to run its course! At the same time, the industry is now regulated, *not so as to provide as well as possible for the needs of the community*, but being in the hands of the abstainer, it is regulated *so as to cause the curve to rise as steeply as possible!*

True, if the management were left in your hands and mine, the community might receive as little consideration; but the problem of the community, though unsolved, would then become soluble; whereas under the other conditions it is insoluble.

I will close this chapter by propounding an Economic puzzle, and will leave the reader to solve it for himself.

I forge Bank-notes for £10,000. These I invest in a new undertaking, which proves to be successful. Nobody discovers that the notes are spurious. I obtain $10^{\circ}/_{\circ}$ interest on my outlay; that is, I receive £1,000 a year. Now, it so happens that, for the first ten years, the money I receive consists of the identical forged notes with which I started operations. During this period, the notes have circulated, and have always been accepted as genuine. As the notes come to hand, I destroy them; and so, for ten years, I derive no benefit from my scheme—which, however, has cost me nothing. But I now begin to benefit, for I still receive £1,000 a year interest (in genuine money). All trace of my fraud is obliterated, and I have a good income for life, as soon as the preliminary ten years is over. An industry has been started which, presumably, would not have been but for my scheme.

Is Money-Capital necessary for industry? Have the spurious notes served the community as well as if they had been genuine? If not, what more would genuine notes have done? *And am I a benefactor or a criminal?*

XII. OWNERSHIP.

The first point that we must grasp in connexion with ownership is that certain things cannot in their very nature be "private property." Buying a thing does not, of itself alone, *necessarily* make that thing the property of the buyer. The fact that one has retained a thing for a long time unchallenged does not, of itself alone, necessarily make it the property of the holder. Slaves never belonged to their so-called owners. Customs, laws, the fact that slaves were *treated* as property, did not make them property. Even the consent of the slave himself made no difference. Few will object to my statement to-day, but if I had been able to make it a century or so ago my confidence on that point would have been less.

Is it possible that, with more or less general consent, certain things are to-day treated as private property, which a future generation will realize to be in the same category as slaves; that is, *that these things cannot be, and never should have been, looked upon as the private property of their so-called owners?* I think it more than likely, for this question of ownershipship has not been dealt with as yet, in practice, on rational lines. *Natural resources* belong (in my opinion, at least) if to any, to the community. They are to be used by, and for the benefit of, the community.

Let us suppose that I supply certain ENTITIES—which were actually mine—for some productive

purpose. I apply them to certain natural ENTITIES, such as minerals, and obtain the produce. Whose is this? It was got by applying my ENTITIES to some of those belonging to the community. It is necessary for us to make some arrangement or assumption with respect to the use of the latter. At present they are held by private individuals, who must be paid for them. (This holds in the main, but even now a little movement towards the principles I have stated is beginning to appear.) Without going fully into this question, we may note that a part of the produce must be reserved for purposes of future production. Have I the right to consume this? The produce was due to my ENTITIES and to natural ENTITIES jointly. Is it possible to prescribe as a condition of my use of the natural ENTITIES that I must reserve what is necessary for productive purposes? That is, to take an example, that if I grow potatoes, and occupy land in doing so, it is necessary that I reserve seed? That I may not use the land otherwise? Now, if I have the right to consume the seed, I must be paid for abstaining from doing so, if the community wants my potatoes. But if my tenure of the land is conditional on my reserving the necessary amount of the produce—that is, if I have no *right* to consume it—I need not be paid for mere ABSTINENCE.

The example is a simple one; suppose we slightly alter it to this form: A piece of land lies ready for cultivation. A merchant possesses a stock of seed potatoes. Workers are ready to supply the necessary labour. I have money to "invest." I buy the stock of seed, and make other necessary payments, but we will confine our attention to the payment I make for seed. When the crop is produced, I require payment of interest; that is, I require payment for ABSTINENCE, and I still consider that the industry owes me the amount of my original outlay. Now, I could have bought the seed and consumed it, or sold it to others for immediate consumption and then spent the money received on consumable goods for myself. But I abstained, and must be paid for so doing. The difference between this form of the example and the simpler one is that I have introduced a number of different people, each taking a part only in the scheme. But, fundamentally, there is no difference between the two cases. Suppose, now, that the use of land (where the original stock was grown) had put the growers under the obligation to produce and save the seed. The seed would not have come into the hands of the Money-Capitalist, but would have remained in the industry. (For obviously, if the grower may not consume the seed, he likewise may not sell it to someone else to consume—or to be paid for abstaining from doing so.) The labour spent on it would be recompensed out of the proceeds of the crop, which would be sold at such a price as to pay for the seed as well. This, of course, really happens at present; no one gives, and no one suggests that anyone should give, seed for nothing. If a transfer of seed is necessary, so as to start a new potato farm elsewhere, the necessary seed must be produced and saved. This must be paid for, as indeed

it is now, out of the proceeds of industry, but no one is to be paid for merely abstaining from consuming it. Industry is thus saved this payment.

Now, as industry in general is always expanding, and more and more "seed" or ENTITY-CAPITAL is constantly required, it is necessary for the price of the produce sold to be sufficient to pay for this. It pays for it at present, but because ABSTINENCE has to be paid for too, it bears this extra cost as well. We have shown that this payment for ABSTINENCE is really due to industry never "getting a start." And if it is to be avoided, industry must pay as it goes on for the increasing quantity of "seed" required. It has not as yet got its start, but *it must catch up*. And then the use of natural resources must carry with it the obligation to produce and reserve the necessary ENTITY-CAPITAL for the continuance and expansion of industry. The ENTITY-CAPITAL reserved will be paid for, but no mere ABSTINENCE will be paid for.

Can all this be accomplished on the large scale, and, if so, how? If not, we must be content with the state of things represented by our diagrams!

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